Remarks

Claims 1-24 were originally filed and have been pending. Claims 16, 17, 19, 21, and 23 were allowed. Claims 11 and 12 were objected to as being dependent upon a rejected base claim, but were said to be allowable if rewritten in independent form.

Thus, Claims 1 and 24 are being herein amended to recite the limitations of Claims 8 and 11, which are being canceled (along with Claim 9), and to specify that the base unit, B, comprises a basic species (basis therefor being found, for example, in Paragraph [0056] of Applicants' published application). Claims 10, 12, and 13 are being amended to adjust their dependencies, and Claim 17 is being editorially amended.

Rejection Under 35 U.S.C. Section 112

Claims 1 and 9 were rejected under the second paragraph of Section 112 as being indefinite. The rejection is respectfully traversed for the following reasons.

The Examiner has stated that it is not clear that the term "polymer-bound" (in reference to a base) can cover a base that is bonded to an inorganic particle. This term no longer appears in Applicants' claims.

The Examiner has further questioned the meaning of the terms "base" and "base unit." Applicants' claims now reference only encapsulated bases "represented by the formula $A\text{-}B_n$, wherein A is a substantially insoluble particle that comprises at least one side-chain crystallizable polymer, each B is an independently selected base unit comprising a basic species, n is an integer of at least 1, and A and B are joined by a covalent chemical bond." Thus, Applicants believe that the Examiner's concerns have been addressed and respectfully request that the rejection under Section 112 be withdrawn.

Rejection Under 35 U.S.C. Section 103

Claims 1-10, 13-15, 18, 20, 22, and 24 were rejected under Section 103(a) as being unpatentable over EP 1 348 742 A2 or Spera et al. (U.S. Patent Application Publication No. US 2003/0194560 A1, the U.S. counterpart of EP 1 348 742 A2; hereinafter, collectively addressed by reference to Spera et al.) in view of Lamon et al. (U.S. Patent No. 6,565,969). This rejection is respectfully traversed for the following reasons.

Applicants claim a composition comprising:

(a) at least one cationically curable species;

(b) at least one cationic photoinitiator; and

(c) at least one encapsulated base selected from those represented by the formula $A\text{-}B_n$, wherein A is a substantially insoluble particle that comprises at least one side-chain crystallizable polymer, each B is an independently selected base unit comprising a basic species, n is an integer of at least 1, and A and B are joined by a covalent chemical bond. (See amended Claim 1.) As mentioned above, the base unit, B, of component (c) of the composition is covalently bonded to A, a substantially insoluble particle that comprises at least one side-chain crystallizable polymer. The particle, A, comprising side-chain crystallizable polymer serves as an encapsulant for the base, B_n (as explained in Paragraph [0061] and following paragraphs).

Applicants previously explained (in remarks that are incorporated herein by reference) that the encapsulated catalysts described by Spera et al. either have no chemical bonding between the catalyst and the encapsulant (when wax or a thermoplastic polymer is used) or have ionic bonding between a nitrogen-containing catalyst and a microgel that contains carboxylic acid functional groups. Thus, Spera et al. fail to teach or suggest the use of Applicants' component (c), a base that is covalently bonded to its encapsulant.

The Examiner has noted the disclosure of "crystalline polymer imidazole" (Intelimer™ 7024 and 7124 from Landec Corporation) by Spera et al. (in Tables 1 and 3). The imidazole component of these Landec materials, however, is believed not to be covalently bonded to the encapsulant polymer. (See the enclosed copy of product literature concerning Landec's Intelimer™ polymers, which states that the polymers "can be prepared as capsules containing free active catalysts or as polymer bound catalysts." The literature further labels Intelimer™ 7024 (containing 33 percent 2-ethyl-4-methyl imidazole catalyst) as being "encapsulated" rather than "polymer bound," and Spera et al. apply the term "encapsulated" to both polymers (see Paragraph [0075]).) Thus, Spera et al. fail to teach or suggest component (c) of Applicants' claimed composition.

The Examiner has asserted that it would have been obvious to employ a combination of curatives from Lamon et al. in the composition of Spera et al. "motivated by a reasonable expectation of providing a composition curable by thermal and radiation means." Applicants are not aware that such "dual cure" has been viewed as desirable in the art (as explained previously in remarks that are incorporated herein by reference).

The Examiner has responded with the further assertion that Lamon et al. suggest a combination of a cationic photoinitiator and a latent thermal catalyst. Applicants disagree, as the portion of the disclosure of Lamon et al. that the Examiner cited in support of this assertion merely references lower temperature cure through use of a single thermal catalyst that can be activated by a means other than application of heat.

Furthermore, even if one assumes for purposes of argument that dual cure compositions are desirable, one skilled in the art would not have chosen this particular combination of curatives when presented with the teachings of Spera et al. and Lamon et al. As explained previously (in remarks that are incorporated herein by reference), not only do the nitrogen-containing curatives and the cationic photocatalysts cure by different mechanisms, but it is known that the former class can inhibit the effectiveness of the latter.

Lamon et al. actually describe at least three types or classes of thermal curatives: (1) polybasic acids and their anhydrides; (2) nitrogen-containing curatives; and (3) chloro-, bromo-, and fluoro-containing Lewis acids of aluminum, boron, antimony, and titanium (see, for example, column 13, lines 30-35). The first and third classes enable thermal cure without the above-referenced risk of inhibition of photocure that is associated with the bases of the second class. Thus, to one skilled in the art, the first and third classes would be the choices having a perhaps reasonable possibility of success. In addition, since the third class initiates cure via a cationic mechanism, one skilled in the art would have been most likely to select this class for combination with cationic photocatalysts if a "dual cure" composition were desired.

For the foregoing reasons, one skilled in the art would not have selected nitrogen-containing curatives from the thermal curatives described by Lamon et al. for use in the composition of Spera et al. This class of curatives simply did not provide a reasonable expectation of success, and better choices were described. Applicants therefore respectfully submit that their invention is indeed patentable over the applied combination of references and respectfully request that the rejection under Section 103 be withdrawn.

Concluding Remarks

Applicants respectfully request entry of the claim amendments submitted on February 21, 2006, as well as those contained herein. Reconsideration and allowance of Applicants' claims are respectfully requested.

Applicants thank the Examiner for the returned copies of Information Disclosure Statements that have been signed by the Examiner. Some of the references on these Statements have not been initialed, however, and Applicants respectfully request confirmation that all references have indeed been considered.

Respectfully submitted,

April 20, 2006
Date

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Enclosure

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Intelimer® Polymers
Catalyze Thermoset Composites

LANDEC Corporation, a specialty materials company in Menlo Park, California, manufactures temperature activated polymer products. These products are based on proprietary side-chain crystallizable polymers that have the unique capability of "off-on" control — a "Switch" temperature. Landec has combined these polymers with a temperature "Switch", together with catalysts, promoters and accelerators for use in epoxy, polyurethane, unsaturated polyester and vinyl ester composite systems. In doing so, Landec's Intelimer Polymers offer a new horizon to formulators seeking the following advantages:

- *Improved Shelf Life* — Latency over a Wider Range of Temperatures
- *Lower Temperature Cure* — Rapid Catalysis Above the Switch
- *Pot Life Extension* — Longer Bath Life for Lower Cost Winding & Hand Lay Up
- *Process Control Over Tack & Drape* — Reduce Pre-Preg Scrap Rates
- *Viscosity Control* — Reliable Filling of More Intricate Molds, Part Consolidation
- *Higher Productivity & Reduced Cost* — Faster Cycle Times Using More Catalyst

Intelimer Polymers can be prepared as capsules containing free active catalysts or as polymer bound catalysts. Below the "Switch" temperature, a crystalline phase works to deactivate or block the catalyst or accelerator. Above the "Switch" temperature, these materials exhibit their normal catalytic or promotion/acceleration activity. The "Switch" temperature can be adjusted by polymer design in narrow increments between 40 & 100°C.

EPOXIES

Landec offers several Intelimer Polymers for catalyzing epoxy based composites.

PRODUCT	TYPE	CATALYST	FEATURES
Intelimer 7024	Encapsulated	EMI-24 33%	Rapid EMI-24 Reactivity in DGEBPA Viscosity doubles in 5 days at 25°C
Intelimer 7004	Polymer Bound	Imidazole 16%	Sole Cure Latency: 6 mon at 40°C Anhydride Latency: 30 days at 40°C
Intelimer 7002	Polymer Bound	Imidazole 15%	Sole Cure: 80-120°C Cure Temps Anhydride Latency: 7 days at 40°C
Intelimer 7001	Polymer Bound	t-Amine 22%	Dicyandiamide Acceleration Maintain CTBN second phase

UNSATURATED POLYESTER & VINYL ESTERS

For unsaturated polyester and vinyl esters, Landec offers a polymer bound cobalt promoter Intelimer Polymer for extension of pot-life in the presence of a peroxide.

PRODUCT	TYPE	CATALYST	FEATURES
Intelimer 6050	Polymer Bound	Cobalt 2%	Greatly Extended Gel Times Comparable Cure Rates to CoNap